

APA

The Engineered Wood Association

Apparent E and Shear-Free E

For structural glued laminated timber (glulam) and most structural composite lumber (SCL) marketed in North America, such as laminated veneer lumber (LVL), the values of apparent modulus of elasticity (E_{apparent}) are generally published. Some SCL manufacturers, however, elect to publish shear-free modulus of elasticity ($E_{\text{shear-free}}$) values. The difference between E_{apparent} and $E_{\text{shear-free}}$ is that E_{apparent} includes both bending deflection and shear deflection, while $E_{\text{shear-free}}$ does not. Therefore, for those proprietary products for which the $E_{\text{shear-free}}$ is published, the shear deflection must be calculated separately from the bending deflection and the two values must be combined for code-compliance. Otherwise, the structural design could be nonconservative when deflection governs.

The publication of E_{apparent} and $E_{\text{shear-free}}$ values for a wide variety of engineered wood products without identifying what E value is being tabulated can be a cause of confusion when comparing similar products offered by different manufacturers or when the need for product substitution arises. To avoid confusion, Equation 1 or Table 1 can be used as a rule of thumb to convert a published E_{apparent} to $E_{\text{shear-free}}$, or vice versa, so that an equitable comparison between similar products can be made:

$$E_{\text{shear-free}} = 1.05 \times E_{\text{apparent}} \quad [1]$$

Table 1. Equivalent E_{apparent} and $E_{\text{shear-free}}$ ^(a)

E_{apparent} (10^6 psi) ^(b)	Equivalent $E_{\text{shear-free}}$ (10^6 psi)
1.5	1.6
1.6	1.7
1.7	1.8
1.8	1.9
1.9	2.0
2.0	2.1
2.1	2.2

a) Refer to APA Technical Topics TT-082 for detailed information.

b) As published for glulam.

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